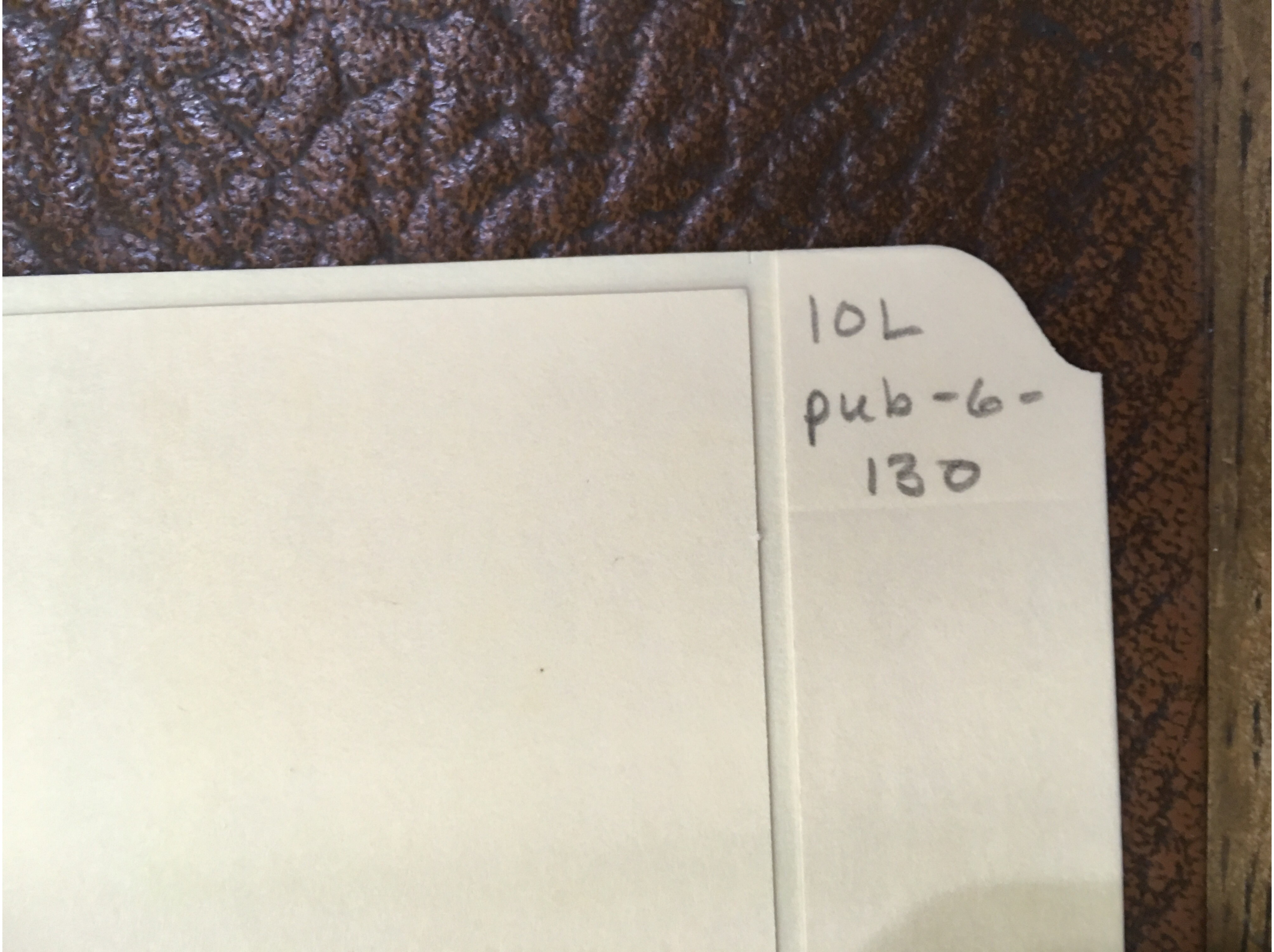
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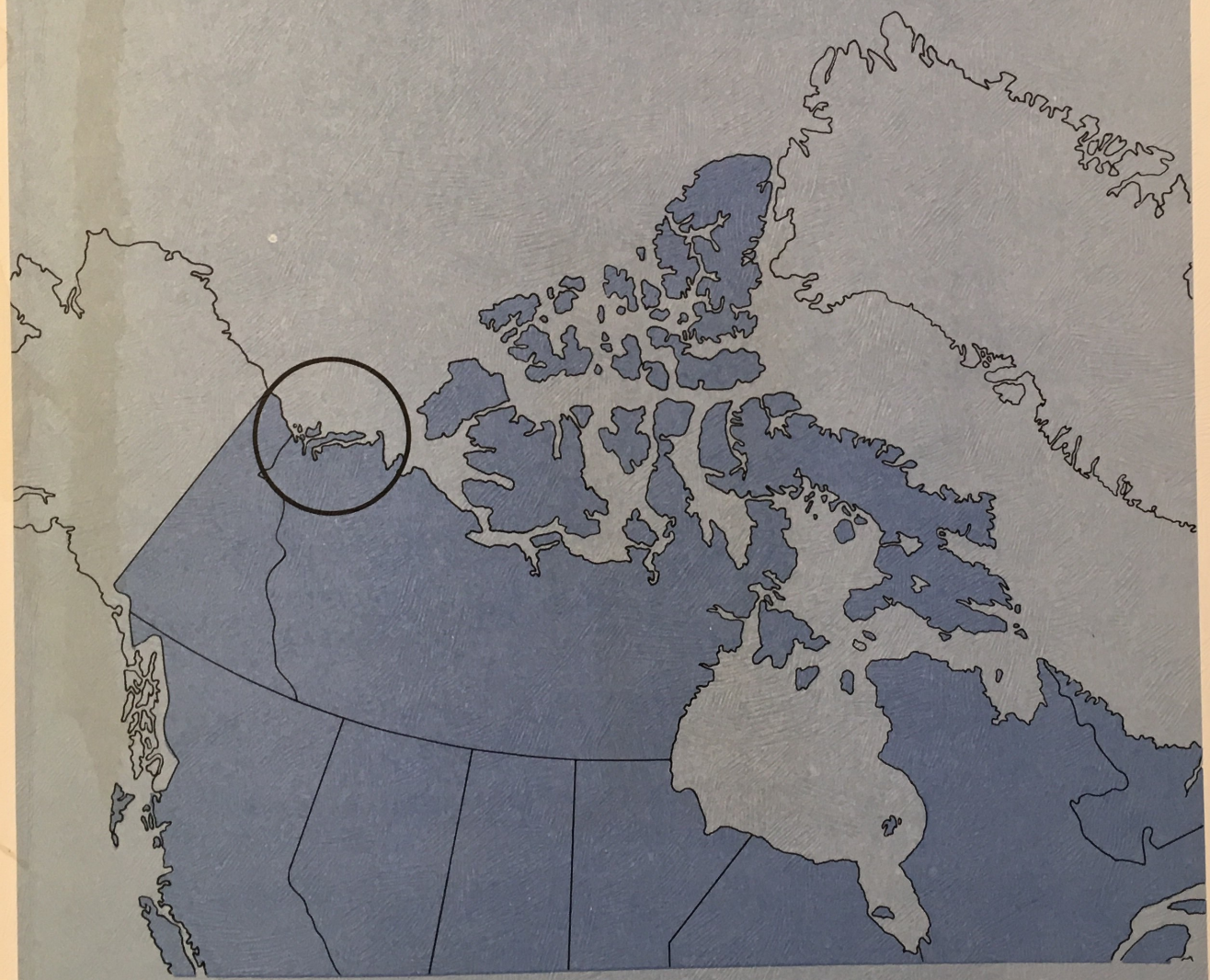
Hydrocarbon Development In The Beaufort Sea – Mackenzie Delta Region



ENVIRONMENTAL IMPACT STATEMENT

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VOLUME 3C MACKENZIE VALLEY SETTING

BEAUFORT SEA-MACKENZIE DELTA ENVIRONMENTAL IMPACT STATEMENT

The Beaufort Sea Production Environmental Impact Statement
was prepared by
Dome Petroleum Limited,
Esso Resources Canada Limited
and
Gulf Canada Resources Inc.
on behalf of all land-holders in the
Beaufort Sea-Mackenzie Delta region.

Information pertaining to the Environmental Impact Statement
and its Support Documents can be obtained from:

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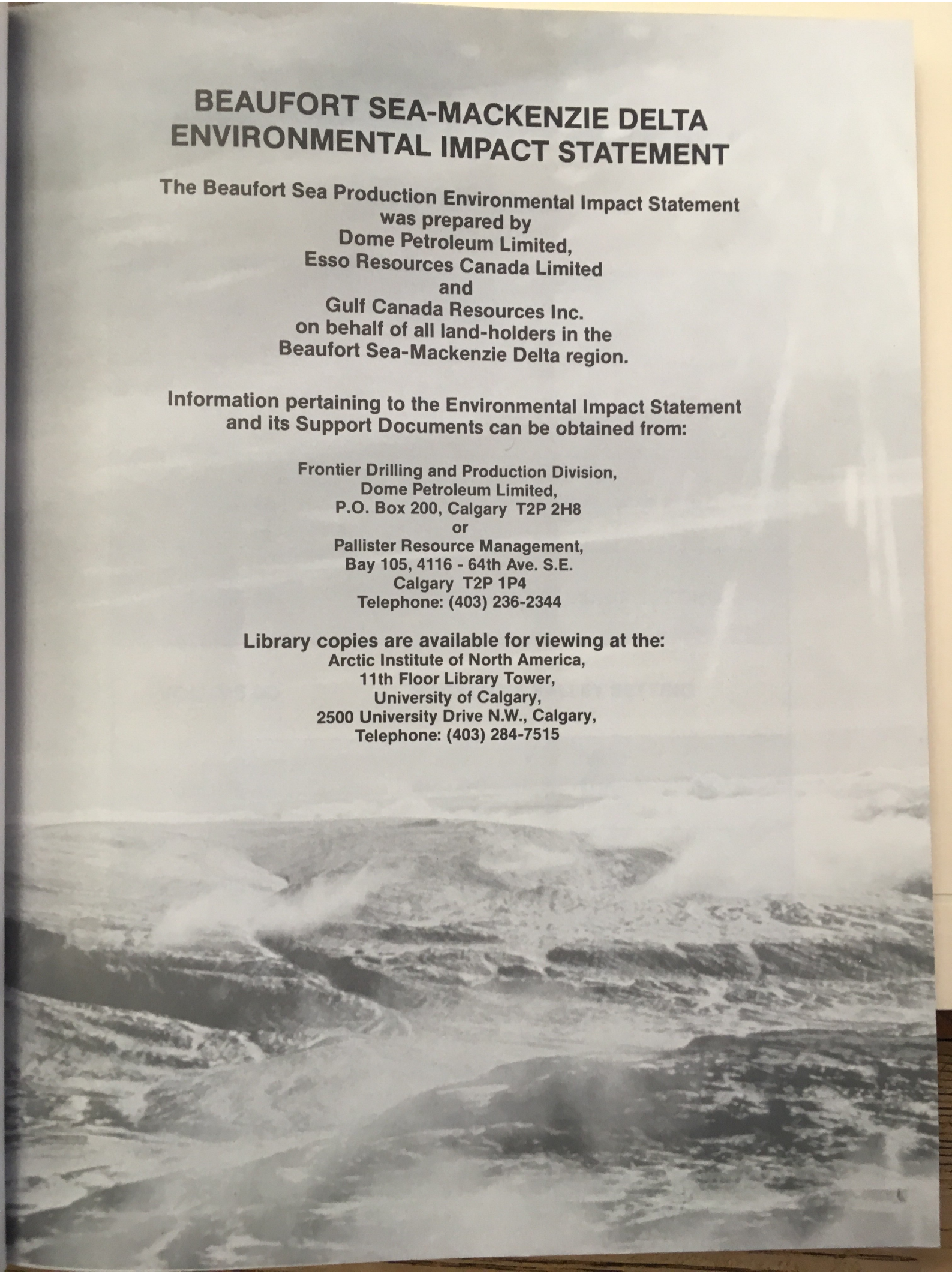
Calgary T2P 1P4
Telephone: (403) 236-2344

Library copies are available for viewing at the:
Arctic Institute of North America,
11th Floor Library Tower,
University of Calgary,
2500 University Drive N.W., Calgary,
Telephone: (403) 284-7515



ENVIRONMENTAL IMPACT STATEMENT

MASTER INDEX

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CHAPTER 2 PLANTS AND ANIMALS

INTRODUCTION

Volume 3C of the Environmental Impact Statement provides the environmental setting for the Mackenzie River Valley pipeline corridor. The 'Mackenzie Valley corridor' extends from the Mackenzie Delta to the Northwest Territories-Alberta border. It includes the Mackenzie River and lands on the adjacent east bank generally 30 to 100 km wide (Figure 1). The 'Mackenzie River Valley' is generally used to describe lands drained by the Mackenzie River. Emphasis has been placed on those subjects deemed most relevant for the purposes of assessing possible impacts of pipelining operations on the environment (Volume 4) and for addressing associated socio-economic issues (Volume 5). The information has also been used to evaluate the potential impacts of hypothetical major oil spills originating from pipelines (Volume 6) and to identify future research and monitoring proposals (Volume 7).

In accordance with the EARP guidelines, the information presented has been summarized as much as practical, while recognizing the importance of providing sufficient detail to permit completion of a satisfactory evaluation. Since the pipeline corridor extends into the coastal area of the Beaufort Sea-Mackenzie Delta region (Volume 3A), there is a necessary duplication of some of the information presented in these two volumes. The environmental setting of the Northwest Passage region is provided in Volume 3B.

For additional information, the reader is referred to various supporting documents to the Environmental Impact Statement as well as the literature cited in the text.

Volume 3C was prepared by the proponents with the assistance of several environmental consulting firms. Major external contributors included:

R.M. Hardy and Associates Ltd. -
Atmospheric Environment
Geology
Soils
Hydrology
Vegetation

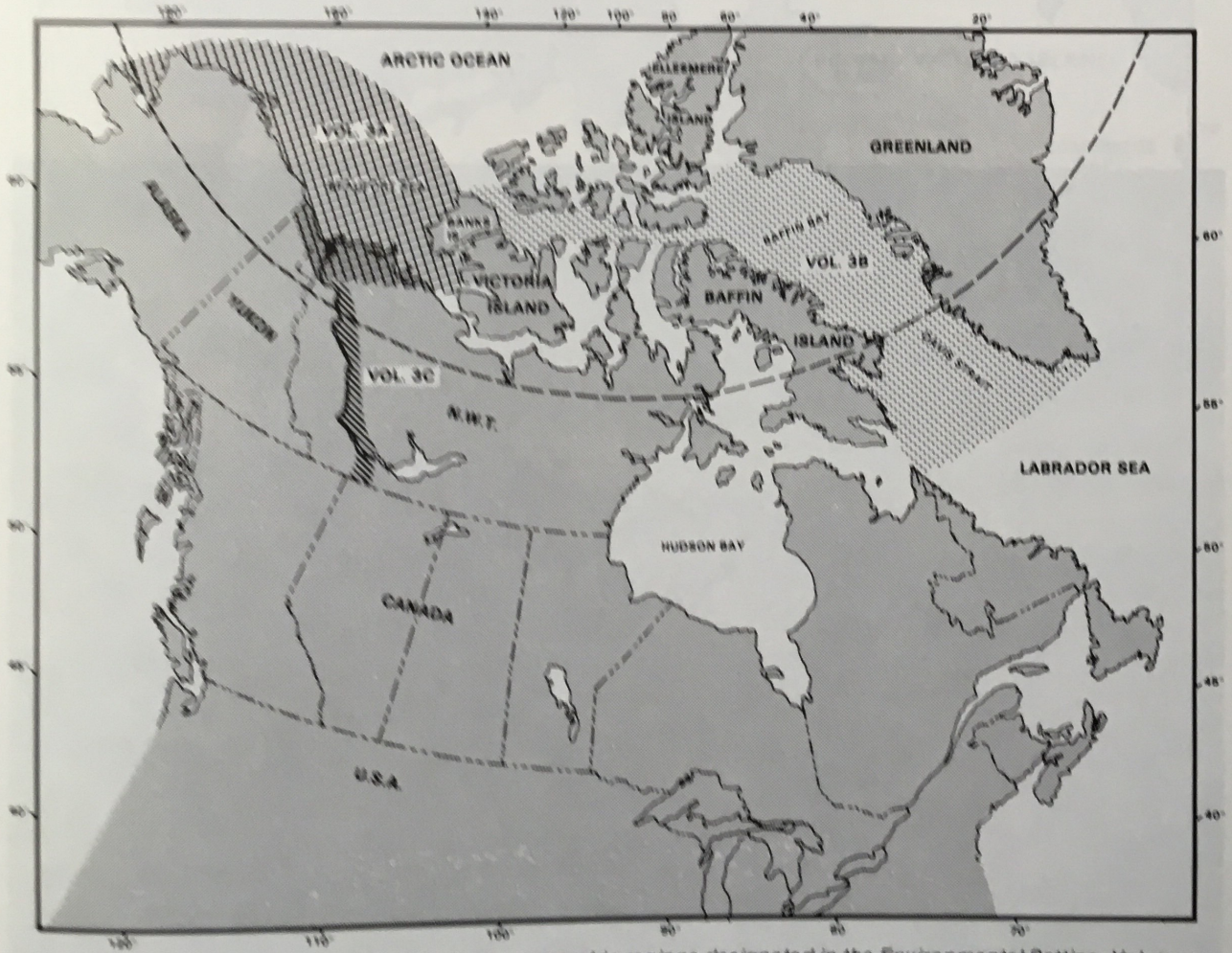

FIGURE 1 *Approximate boundaries of the three geographic regions designated in the Environmental Setting, Volumes 3A, 3B and 3C.*

TABLE 2.1-1

TERRESTRIAL MAMMALS IN THE MACKENZIE VALLEY CORRIDOR

Common Name	Scientific Name
Masked shrew	Sorex cinereus
Dusky shrew	Sorex monticolus
Arctic shrew	Sorex arcticus
Water shrew	Sorex palustris
Pygmy shrew	Microsorex hoyi
Little brown bat	Myotis lucifugus
Snowshoe hare	Lepus americanus
Least chipmunk	Eutamias minimus
Woodchuck	Marmota monax
Arctic ground squirrel	Spermophilus parryii
American red squirrel	Tamiasciurus hudsonicus
Northern flying squirrel	Glaucomys sabrinus
American beaver	Castor canadensis
Deer mouse	Peromyscus maniculatus
Northern red-backed vole	Clethrionomys rutilus
Gapper's red-backed vole	Clethrionomys gapperi
Heather vole	Phenacomys intermedius
Brown lemming	Lemmus sibiricus
Northern bog lemming	Synaptomys borealis
Collared lemming	Dicrostonyx torquatus
Muskrat	Ondatra zibethicus
Meadow vole	Microtus pennsylvanicus
Tundra vole	Microtus oeconomus
Chestnut-cheeked vole	Microtus xanthognathus
Meadow jumping mouse	Zapus hudsonius
Porcupine	Erethizon dorsatum
Coyote	Canis latrans
Wolf	Canis lupus
Arctic fox	Alopex lagopus
Red fox	Vulpes vulpes
American black bear	Ursus americanus
Grizzly bear	Ursus arctos
American marten	Martes americana
Fisher	Martes pennanti
Ermine	Mustela erminea
Least weasel	Mustela nivalis
American mink	Mustela vison
Striped skunk	Mephitis mephitis
Wolverine	Gulo gulo
River otter	Lutra canadensis
Lynx	Lynx canadensis
White-tailed deer	Odocoileus virginianus
Mule deer	Odocoileus hemionus
Moose	Alces alces
Caribou	Rangifer tarandus

Sources: Banfield, 1974; Youngman, 1975; Jones, et al, 1979.

(Skoog, 1968). About 80% of the adult females produce one calf each year so that calves typically form 26 to 35% of the population in a herd with a sex ratio of 1 male to 2 females. Recruitment of calves which survive until one year of age is estimated to be 15% of the caribou population although it is often lower (Thompson *et al.*, 1980).

The Bluenose herd is the only population of barren-ground caribou that ranges within the Mackenzie Valley corridor (Plate 2.1-1). (The Porcupine caribou herd does not frequent the corridor. Details of this herd are provided in Volume 3A, Section 4.1). The range of the Bluenose herd includes the mainland of the Northwest Territories between the Coppermine and Mackenzie rivers north of Great Bear Lake (Hawley *et al.*, 1976) (Figure 2.1-2). Several studies during the past 25 years have resulted in a variety of herd population estimates ranging from 35,000 to 40,000 in the 1950's (Kelsall, 1968); 39,900 in the mid 1960's (Hawley and Pearson, 1966); 19,000 in 1967 (Thomas, 1969); to 92,000 in 1974 (Hawley *et al.*, 1976); 42,000 in March 1977 (Wooley and Mair, 1977); 33,000 in June 1978 and 37,000 in June 1979 (Brackett *et al.*, 1978, 1979); 58,000 in March 1980 and 38,000 in February 1981 (Carruthers and Jakimchuk, 1981). This herd is presently considered to be stable at about 40,000 animals (D. Heard, pers. comm.).

The most frequently used winter range of the Bluenose herd is between the Kugaluk River and Horton Lake and along the northeast shore of Great Bear Lake (Figure 2.1-2). Kelsall (1968) reported that some caribou crossed the Mackenzie River near Fort Norman in the winter of 1950-51, although similar movements have not been documented recently (Prescott *et al.*, 1973a). A westward expansion of the winter range was reported in the mid 1970's (Decker, 1976; Hawley *et al.*, 1976). Surveys conducted by Wooley and Mair (1977) to determine the potential for interaction between the Bluenose herd and the proposed Arctic Gas pipeline revealed numerous caribou wintering north of Colville Lake, but very few animals west of the Miner River. These authors concluded that, if the herd continued to winter in the same locations as used in 1976-1977, they would not encounter the pipeline. They expected that a few 'resident' caribou would encounter the pipeline, with interactions most likely occurring between Sitidgi Lake and the Thunder River.

Some barren-ground caribou may be included in a group of undetermined species that winters near Travaillant Lake and summers just south of Eskimo Lakes. This group has been estimated to number between 1,000 and 2,000 animals, and may also include woodland caribou and feral reindeer (Prescott *et al.*, 1973a). Although they approach the Mackenzie River near Travaillant Lake during winter, most occur to the north and east of the lake.

Spring migration of the Bluenose herd may begin as early as mid to late February, along routes from their winter range to calving grounds on the Bathurst Peninsula, in the Melville Hills, and near Bluenose Lake (Hawley *et al.*, 1976) (Figure 2.1-2). Post-

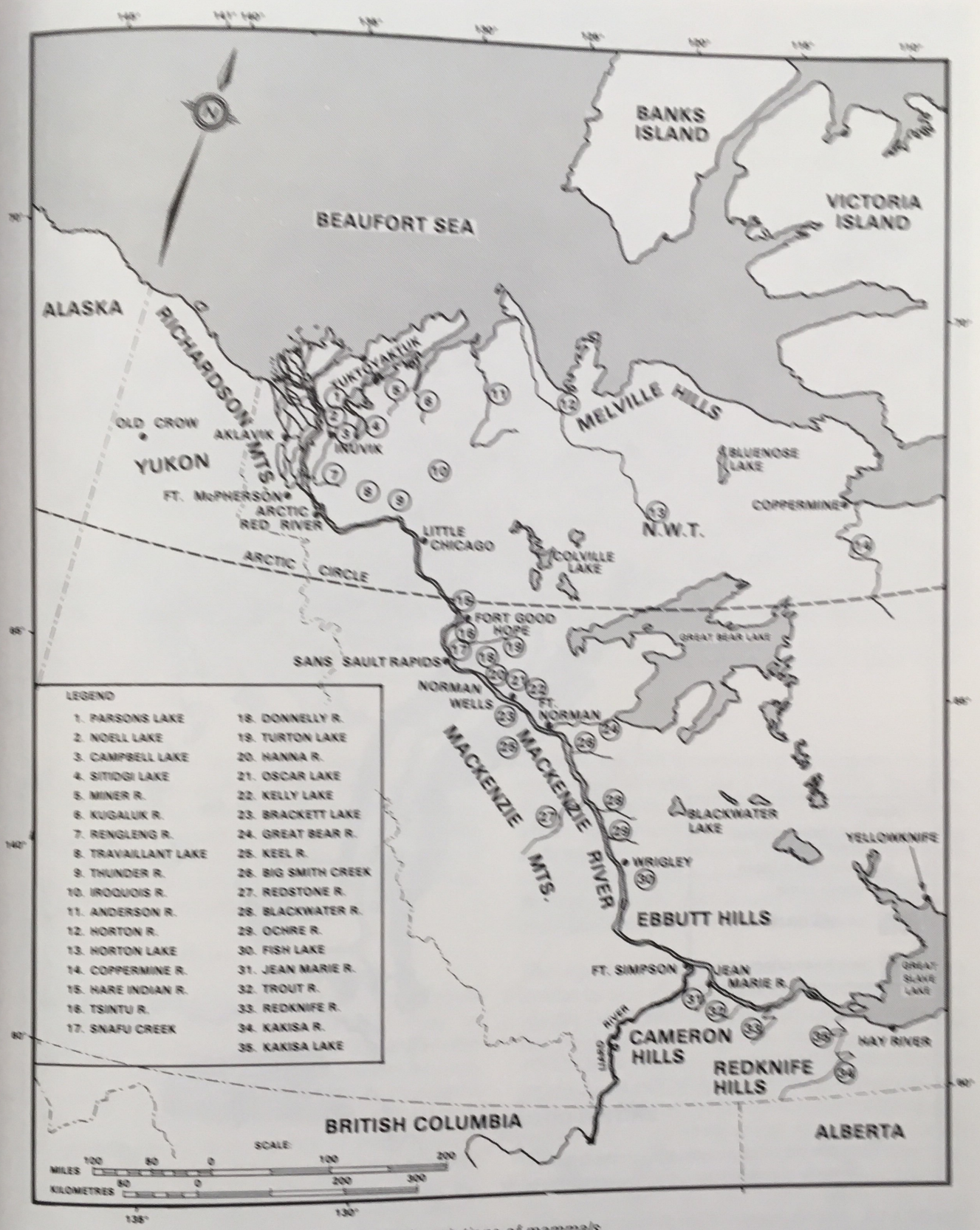

FIGURE 2.1-1 *Geographic names referred to in descriptions of mammals.*

TABLE 2.2-1 (Cont'd)

COMMON AND SCIENTIFIC NAMES OF BIRDS DISCUSSED IN SECTION 2.2 OF VOLUME 3C

Common Name	Scientific Name
Grouse	
Spruce grouse	Canachites canadensis
Ruffed grouse	Bonasa umbellus
Sharp-tailed grouse	Pedioecetes phasianellus
Willow ptarmigan	Lagopus lagopus
Rock ptarmigan	Lagopus mutus
Cranes	
Sandhill crane	Grus canadensis
Whooping crane	Grus americana
Shorebirds	
American golden plover	Pluvialis dominica
Whimbrel	Numenius phaeopus
Eskimo curlew	Numenius borealis
Greater yellow-legs	Tringa melanoleuca
Stilt sandpiper	Micropalama himantopus
Short-billed dowitcher	Limnodromus griseus
Upland sandpiper	Bartramia longicauda
Buff-breasted sandpiper	Tryngites subruficollis
Solitary sandpiper	Tringa solitaria
Spotted sandpiper	Actitis macularia
Wilson's phalarope	Steganopus tricolor
Red phalarope	Phalaropus fulicarius
Northern phalarope	Lobipes lobatus
Gulls and Terns	
Glaucous gull	Larus hyperboreus
Herring gull	Larus argentatus
California gull	Larus californicus
Ring-billed gull	Larus delawarensis
Mew gull	Larus canus
Bonaparte's gull	Larus philadelphia
Thayer's gull	Larus thayeri
Arctic tern	Sterna paradisaea
Common tern	Sterna hirundo
Caspian tern	Sterna caspia
Black tern	Chlidonias niger
Other Waterbirds	
Parasitic jaeger	Stercorarius parasiticus
Long-tailed jaeger	Stercorarius longicaudus
American bittern	Botaurus lentiginosus
Sora	Porzana carolina
American coot	Fulica americana
Passerines and 'Near-Passerines'	
Common nighthawk	Chordeiles minor
Belted kingfisher	Megaceryle alcyon
Hairy woodpecker	Picoides villosus
Cliff swallow	Petrochelidon pyrrhonota
Gray jay	Perisoreus canadensis
Common raven	Corvus corax
Northern shrike	Lanius excubitor
Tennessee warbler	Vermivora peregrina
Yellow warbler	Dendroica petechia
Dark-eyed junco	Junco hyemalis
Chipping sparrow	Spizella passerina

2.2.1 LOONS

Loons are migratory and spend their winters in near-shore marine waters of the Atlantic and Pacific coasts. Migration of the Arctic-nesting species is mainly coastal, but there is some movement of loons along inland routes (Palmer, 1962). Although loons may occur in flocks in wintering areas, they usually occur singly or in small flocks during migration (Palmer, 1962). Loons feed primarily on fish, but also take various types of marine and freshwater invertebrates (Palmer, 1962).

Four species of loons (common, yellow-billed, Arctic and red-throated) occur in the Mackenzie Valley (Plate 2.2-1). The yellow-billed loon possibly migrates through the area in spring enroute from wintering areas on the Pacific coast to breeding areas east of the Valley (Palmer, 1962; Griffiths, 1973). The common and Arctic loons are common breeding species in the Mackenzie Valley, whereas the red-throated loon is an uncommon breeding species. The Arctic loon nests primarily north of Wrigley while the common loon is most abundant south of Wrigley (Campbell and Weber, 1973; Salter, 1974a; Salter and Davis, 1974; Tull *et al.*, 1974; Ward, 1975; Wiseley and Tull, 1977). Tate (1981) lists the common loon on the 'blue list' of North American 'species of concern.' An explanation of this list and the statuses assigned to species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are given in Table 2.2-2.

The Arctic loon nests on lakes and large ponds, while the common loon nests on small or large lakes (Palmer, 1962). Palmer (1962) gives the time taken from egg-laying to fledging as approximately three months for the common loon, but it may be as little as 70 days for the Arctic loon (cf. Johnson *et al.*, 1975).

The Mackenzie Valley is a spring migration corridor for common and Arctic loons. These two species first arrive in the southern Mackenzie Valley during early May (May 6-7 in 1973; Salter *et al.*, 1974). In 1973 the peak of the Arctic loon migration was May 16 at Fort Simpson and May 23 at Wrigley; the peak of common loon migration at Norman Wells was May 25 (Salter *et al.*, 1974). Red-throated loons were uncommon migrants during this study and yellow-billed loons were not recorded.

Several aerial surveys have been conducted on the numbers of waterbirds along proposed pipeline routes through the Mackenzie Valley. Estimates of loon population densities have ranged from a low of 0.01 loons/km^2 between Willowlake River and Bistcho Lake during late May and early June, 1975 (Patterson and Wiseley, 1977), to a high of 0.20 loons/km^2 between Norman Wells and Richards Island in 1973 (Salter, 1974a).

The above values are deceptively low because the area surveyed included both dry and wetland habitats. More realistic numbers were generated in a study of only wetland habitat along the proposed Arctic Gas Pipeline corridor from Richards Island to the Alberta border by Poston (1977). In late May and early June, Poston recorded 0.92 loons/km^2 of wetland south of the Willowlake River, 4.49 [illegible] Great Bear and

TABLE 2.2-2

DEFINITIONS OF STATUS FOR SPECIES WITH DECLINING POPULATIONS

Status as defined by Committee On the Status of Endangered Wildlife In Canada (COSEWIC)

Species:	any species, subspecies, or geographically separate population.
Rare Species:	any indigenous species of fauna or flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reason, exists in low numbers or in very restricted areas in Canada but is not a threatened species.
Threatened Species:	any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.
Endangered Species:	any indigenous species of fauna or flora whose existence in Canada is threatened with immediate extinction through all or a significant portion of its range, owing to the action of man.

Status for inclusion on the Blue List of American Birds*

1. those species that may or may not be declining now, but may be in jeopardy in the foreseeable future;
2. those species that occur in such small numbers that their status should be monitored;
3. those species for which there are no scientific data to determine whether or not they are declining, but for which there is definite concern; or
4. those species that give definite evidence of non-cyclical declines in all or part of their ranges.

*The journal American Birds has prepared and updates yearly an unofficial 'blue list' of North American bird species that are not endangered, but that are considered to be of concern, for the reasons listed in this table.

Willowlake rivers, 1.75 loons/km^2 of wetland between Fort Good Hope and the Great Bear River, 5.79 loons/km^2 of wetland between Campbell Lake and Fort Good Hope, and 2.57 loons/km^2 of wetland between Richards Island and Campbell Lake.

The Mackenzie Valley is also a corridor for fall migration of common, Arctic and red-throated loons (Salter, 1974b). These migrations are generally underway by the second half of August (Salter, 1974b), continuing at least until the end of September. In 1972 the peak of loon migration at Tate Lake (south of Fort Norman) occurred on September 14 and 15. Some of the larger lakes are important staging areas for loons during the autumn. More than 1,000 loons were recorded on Stewart Lake (south of Tate Lake) in the third week of September 1971, and 150 loons were present on Trout Lake during late September 1972 (Davis, 1974).

2.2.2 GREBES

The red-necked and horned grebes both breed throughout the Mackenzie Valley (Godfrey, 1966). As the status of the red-necked grebe is of some concern it is included on the 'blue list' of North American species (Tate, 1981).

Grebes are migratory. They winter in marine waters of the Atlantic and Pacific coasts and migrate through the interior to summer in the north. They frequently occur in small flocks at staging areas (Palmer, 1962). In freshwater locations grebes feed primarily on small fish, insects and some crustaceans (Palmer, 1962).

Grebes moving to and from breeding areas in the Mackenzie Valley probably use the Valley as a migra-

TABLE 2.3-6

KNOWN HABITAT UTILIZATION OF MAJOR WATERBODIES SAMPLED TO DATE IN THE MACKENZIE VALLEY CORRIDOR
Four Letter Fish Codes are Identified in Table 2.3-4.

Data are from McCart *et al.* (1974) and unpublished Aquatic Environments Limited information. Locations indicated on FIGURE 2.3-1.

Streams Within the Mackenzie Valley Corridor	Location	Habitat Use and Sensitivity
Kakisa River	1	S[1] (GRAY, PIKE, LNSK, WALL); Srs[4] (fall spawners); F[8] (PIKE, LKCB, TRPH)
Trout Lake	2	Ss[2](LKTR, HMWT, PIKE, WALL); Sr[3](PIKE, LNSK, BURB, WALL); W[10](LKTR, LKCS, ARCS, RDWT, INCO, GRAY, PIKE, LNSK, BURB, WALL)
Trout River	3	S, N[5](GRAY, PIKE, LKCB, LNSK, WALL); F; Ws[11]
Jean-Marie Creek	4	Sr(*Coregonus* spp., *Prosopium* spp., GRAY, PIKE, *Catostomus* spp., WALL); S; F; N; W
Spence River	5	S, N(GRAY, PIKE, EMSR, LNSK); F
Rabbitskin River	6	S(MTWT, GRAY, PIKE, LNSK, WHSK, WALL); Ss(GRAY, Chub spp., BURB, TRPH, SLSC, SPSC); N(HMWT, GRAY, PIKE, LNDC TRPH); F, R[7](HMWT, INCO, PIKE, LNSK); W
Bluefish Creek	7	Ss(GRAY, PIKE); N(GRAY)
Harris River	8	Ss(WALL); S(GRAY, PIKE, LNSK); N(BDWT, HMWT, PIKE, LNSK); Ws
Trail River	9	S(GRAY, PIKE, LNSK); Ss(WALL); N(GRAY, LNSK, WALL); F; Ws
Willowlake River	10	S(RDWT, GRAY, PIKE, LNSK; M[3]; F(LKCS, HMWT, PIKE, RBDC, LKCB, EMSR, SPSR, LNSK, WHSK, BURB, TRPH, WALL, SLSC); W
River Between Two Mountains	11	S(RDWT, GRAY, LNSK, SLSC); Si[12](LNDC, SLSC); N(MTWT, LNSK); R(RDWT, GRAY, SLSC); F(RDWT, GRAY, PIKE, SLSC); W; Sr
Smith Creek	12	Ss; Ns[6]; Fs; Ws
Tributary to Hodgson Creek	13	S(GRAY, SLSC); F(GRAY)
Hodgson Creek	14	S(RDWT, GRAY, LKCB, LNSK, SLSC); N(LKCB, LNSK); Ns(GRAY); R(GRAY, PIKE, LKCB, LNSK, SLSC); F(GRAY, PIKE, LKCB, LNSK, SLSC); Ws
Noname Creek (40-1, South Fork)	16	S(GRAY, LKCB, SLSC); Ss(*Prosopium* spp.); R(GRAY, LKCB, SLSK); F(GRAY); Ws
Noname Creek (40-1, North Fork)	17	S, R, F, W(GRAY, SLSC)
Blackwater River	18	S(GRAY, SLSC); R(GRAY, SLSC); F(GRAY, LKCB, SPSR, LNSK, SLSC); M(GRAY, whitefishh spp.); Ws
Unnamed Tributary to Blackwater River	19	S(GRAY, SLSC); N; F(*Salvelinus* spp.): Ws(GRAY, SLSC)
Birch Island Creek	20	S(GRAY, SLSC); R(GRAY); F(GRAY, FLCB, SLSC); Ws(GRAY, SLSC)

(Table 2.3-6 continued)

Streams Within the Mackenzie Valley Corridor	Location	Habitat Use and Sensitivity
Saline River	21	Si(*Prosopium* spp., GRAY, LKCB, LNSK, SLSC); R(*Prosopium* spp., GRAY, LKCB, LNSK, SLSC); F(*Prosopium* spp., GRAY, LKCB, LNSK, SLSC); W(*Prosopium* spp., GRAY, LNSK)
Little Smith Creek	22	S(GRAY, LKCB, LNSK, BURB, WALL); Ss(RDWT); N; F(DOLL, RDWT, GRAY, PIKE, LKCB, FLCB, LNSK, SLSC); Ws
Big Smith Creek	23	S(GRAY, LKCB, SLSC); Ns; R(LKCB, SLSC); F(GRAY, PIKE); Ws
St. Charles Creek	24	S, N(GRAY)
Brackett River	25	Sr(Whitefish spp.); N; F; W
Great Bear River	26	Ss(ARCS, RDWT, INCO, GRAY, PIKE, LKCB, LNSK, BURB, Stickleback spp., Sculpin spp.); N(LKTR); Ns (ARCS, RDWT, INCO, GRAY PIKE, LKCB, LNSK, BURB, Stickleback spp., Sculpin spp.); Ms(GRAY, RDWT, INCO, GRAY, PIKE)
Bear Rock Lake	27	S, N, F, W(LKTR)
Bluefish Creek	28	*N(HMWT, BDWT)
Jungle Ridge Creek	29	S, R, F(GRAY, LNSK, SLSC)
Nota Lake	30	F(GRAY); Fi(LKCB, LNSK)
Nota Creek	31	S(GRAY, SLSC); R(GRAY, LKCB, SLSC); F(GRAY, LKCB, SLSC); Fi(LNSK)
Kelly Lake	32	S; N; F; W
Vermilion Creek	33	S(GRAY, LKCB, LNSK, SLSC); *N(ARCS, HMWT, BDWT, GRAY, WALL); R(GRAY, LKCB, LNSK, SLSC); F(HMWT, BDWT, RDWT, INCO, GRAY, FLCB, LNSK, BURB, TRPH, SLSC); W(GRAY, SLSC)
Prohibition Creek	34	S(GRAY, LKCB, SLSC); *N(HMWT, BDWT); R(GRAY, LKCB, SLSC); F(ARCS, HMWT, BDWT, RDWT, GRAY LKCB, SPSR, LNSK, TRPH, SLSC, SPSC); R(GRAY, LKCB, SLSC)
Helava Creek	35	S(LKCB, SLSC); F(GRAY, PIKE, LKCB, SLSC, SPSC); R(LKCB, SLSC)
Francis Creek	36	S(GRAY, SLSC); R(GRAY, SLSC); F(GRAY, LKCB, SLSC)
Canyon Creek	37	S, N(GRAY, LKCB, SLSC); F(GRAY, LKCB, LNSK, SLSC); Ws
Bosworth Creek	38	S(GRAY, LNSK); N; F(INCO, GRAY, LKCB, LNDC, LNSK, BURB, NNST, TRPH, SLSC)
Billy Creek	39	S, R, W(PIKE)
Esox Lake	40	S, R, F(PIKE)
Chain Lakes Outlet	41	Assessment unavailable
Oscar Creek	42	S, R, F(GRAY, LKCB, LNSK, WHSK); Srs(GRAY, PIKE, LNSK, WALL); N(Whitefish spp.); Ws
Elliot Creek	43	S, R, F(GRAY, LKCB, SLSC); Ws
Carcajou Ridge Lake	44	Ss, F, W(LKTR, PIKE)

(Table 2.3-6 continued)

Streams Within the Mackenzie Valley Corridor	Location	Habitat Use and Sensitivity
Moon Lake	45	S, R, F(GRAY); Ss, F(RDWT); Ws(HMWT, RDWT, GRAY, PIKE, BURB, SLSC)
Jack Lake	46	Ss, Rs(PIKE); F, W(PIKE)
Hanna River	47	S, F, Ws(GRAY, SLSC, PIKE); N(GRAY)
Dieter Creek	48	S, R(GRAY)
Gibson Creek	49	Ss, Ws(GRAY); Ns, Fs
Chick Lake	50	S, R, F(GRAY, PIKE, LNSK, BURB); Ws(PIKE, BURB)
Chick Creek	51	S, R, F(GRAY); F(PIKE)
Donnelly River	52	S, N, F(GRAY); Ss(RDWT, INCO, LKCB, TRPH, WALL); S(PIKE); S, N(LNSK)
Gilbert Lake	53	S, R, W(PIKE)
Snafu Creek	54	S, R(GRAY, PIKE, LNSK); F(SLSC)
Tsintu River	55	S, R(GRAY, LNSK, WALL, SLSC, PIKE)
Hare Indian River	56	S, N(GRAY, LNSK); F, W, M
Bluefish River	57	S, N, F, W
Loon Lake	58	Ss(LSCS, BDWT, Stickleback spp.); Fs(LNSK); Ws
Loon River	59	S, N(GRAY, PIKE, LNDC, LNSK); Ss(Cisco spp., Whitefish spp., LKCB, NNST); N(Cisco spp., Whitefish spp.); Ws
Yeltea Lake	60	Ss, W(LKTR, Whitefish spp., Stickleback spp.); N, F
Payne Creek	62	S, N(GRAY)
Thunder River	63	S, N, W(LKTR, HMWT, BDWT, RDWT, GRAY)
Travaillant River	64	Ss(GRAY, LNSK); R(LNSK)
Rengleng River	65	S, N(HMWT, BDWT, GRAY, PIKE); Ns(WALL); Ss(LNSK, BURB, WALL)
Loche Lake	66	Suggested use by burbot
Jiggle Lake	67	S, F, W(LKTR, LSCS, HMWT, PIKE, BURB)
Deep Lake	68	S, R, F(LKTR, LSCS, HMWT, PIKE)
Sandy Lake	69	S, F, W(LKTR, HMWT, BDWT, GRAY, PIKE)
Point Lake Outlet	70	S, R(GRAY, PIKE); F(Whitefish spp., PONS)
Highpoint Lake Outlet	71	S, R(GRAY); F(PIKE)
Caribou Creek	72	S, N(GRAY); F(HMWT, GRAY, PONS, TRPH)
Caribou Lake	73	Utilized by humpback whitefish
Unnamed Tributary to Campbell Lake	74	Sr(Whitefish spp.); utilization by northern pike
Miner River	75	S, F, N(GRAY)
Norris Creek	76	S, F, N(GRAY)
Noell's Lake Outlet	77	S, N(GRAY); R(PIKE)
Island Lake Outlet	78	S, N, F(GRAY)
Peter Lake	79	S, R(LKTR, LSCS, Whitefish spp.), F(GRAY); Ws; utilized by *Coregonus* spp.

(Table 2.3-6 continued)

Streams Within the Mackenzie Valley Corridor	Location	Habitat Use and Sensitivity
Most Southerly Wolverine Lake	80	F(GRAY); Ws
Wolverine Lake	81	Ss, F(LKTR, BDWT, PIKE, BURB)
Unnamed Lake (Holmes Creek inlet)	82	S, R, W(LKTR, BDWT, RDWT)
Holmes Creek	83	S, R(GRAY); F(Whitefish spp., PIKE); Ms(LSCS)

1. S - spawning
2. Ss - suspected spawning
3. Sr/M - spawning run/migratory route
4. Srs/Ms - suspected spawning run/suspected migratory route
5. N - nursery
6. Ns - suspected nursery
7. R - rearing
8. F - summer feeding
9. Fi - incidental feeding
10. W - conditions suitable for overwintering
11. Ws - possible overwintering/conditions appear suitable for overwintering
12. Si - incidental spawning
- unable to distinguish between humpback and broad whitefish, therefore both present

(Table 2.3-6 continued)

2.3.5.1 Migration

The most important migration routes within the Mackenzie Valley corridor are the Mackenzie Delta channels, the mainstem of the Mackenzie River and the Great Bear River. Several tributaries on the west bank of the Mackenzie River are also known to be important migration routes.

Large numbers of anadromous fish, including a large proportion of spawners, swim downstream through the Mackenzie Delta at spring break-up, enroute to coastal waters. They generally return upstream to fresh water beginning in mid summer (Volume 3A, Section 3.4). Most of these anadromous fish, including Arctic char, ciscos, whitefish and inconnu, are autumn spawners. With the exception of Arctic char, these species concentrate in lower portions of the Mackenzie River mainstem during August and September (Stein *et al.*, 1973a,b). It is reported that Arctic cisco move upstream as far as Norman Wells during their spawning migrations. After spawning, they return downstream to their overwintering areas (Stein *et al.*, 1973a,b).

During spring and summer, spring spawners usually migrate short distances from the Mackenzie River mainstem and its larger tributaries into spawning areas in smaller tributaries, or from overwintering areas to summer feeding habitats. Concentrations of Arctic grayling and longnose suckers have been seen in small clear tributary streams within the corridor (Stein *et al.*, 1973a,b; McCart *et al.*, 1974; Tripp and McCart, 1974). Migrations of northern pike and yellow walleye are even shorter, often involving movements within a single watercourse in search of suitable spawning habitat. Post-spawning movements of adults to the Mackenzie River mainstem and larger tributaries are usually in late June. Migration from smaller tributaries to larger overwintering watercourses by summer resident adult and juvenile grayling occurs during the autumn (Stein *et al.*, 1973a, b). Ripe boreal smelt have been caught on the Mackenzie Delta through the ice (Mann, 1975; Percy, 1975), but little is known of their movements before, during or after spawning.

2.3.5.2 Spawning

Despite extensive sampling efforts in the Mackenzie River system spawning areas for many species have not yet been identified. Hatfield *et al.* (1972) classified areas of potential spawning habitat in major sub-drainages within the Mackenzie system but actual use of these areas remains unknown. High turbidity, brief spawning periods, poor access, and the large geographic area have hindered the definition of many spawning areas and the number of fish using them. However, observations of emerging juveniles, spawned-out fish and large pre and post-

TABLE 2.5-2
AVERAGE ANNUAL EXPORT AND VALUE OF FURS EXPORTED FROM COMMUNITIES WITHIN THE MACKENZIE VALLEY CORRIDOR.

Species	Inuvik		Fort Good Hope		Norman Wells		Fort Norman	
	Number[a]	Value[b]	Number	Value	Number	Value	Number	Value
Bear, polar	5.88	$ 6,198.46	0	$ 0	0.29	$ 305.71	0	$ 0
Bear, other	10.63	882.29	14.13	1,172.79	10.29	854.07	1.38	114.54
Beaver	102.50	2,857.70	508.00	14,163.04	29.00	808.52	178.88	4,987.17
Coyote	0	0	0	0	0	0	0	0
Fisher	0	0	0	0	0	0	0	0
Arctic Fox[c]	879.75	34,167.37	17.63	684.90	5.89	227.88	5.76	224.14
Coloured Fox[d]	340.14	33,305,94	50.14	4,719.55	17.29	1,624.94	26.02	2,353.37
Lynx	167.50	46,092.65	36.00	9,906.48	2.86	787.01	8.25	2,270.24
Marten	875.13	33,456.22	1,566.00	59,868.18	255.71	9,775.79	830.25	31,740.46
Mink	738.50	27,930.00	105.25	3,980.56	23.43	886.12	60.00	2,269.20
Muskrat	176.63	173,069.02	2,546.25	12,527.55	715.58	3,520.65	652.63	3,210.94
Otter	0.38	26.69	1.25	87.79	0.29	20.37	1.13	79.36
Squirrel	17.13	26.89	62.13	97.54	6.00	9.42	7.13	11.19
Weasel	372.75	503.21	75.50	101.93	4.71	6.36	13.50	18.23
Wolf	24.25	4,892.92	6.88	1,388.18	8.43	1,700.92	3.00	605.31
Wolverine	5.88	1,166.18	1.38	273.70	2.43	481.94	1.25	247.91
Years of data	8		8		7		8	

Species	FORT FRANKLIN		WRIGLEY		FORT SIMPSON JEAN-MARIE RIVER		TROUT LAKE	
	Number	Value	Number	Value	Number	Value	Number	Value
Bear, polar	0.29	$ 305.71	0	$ 0	0	$ 0	0	$ 0
Bear, other	3.00	249.00	1.50	124.50	13.50	1,120.50	0.33	27.39
Beaver	179.86	5,014.50	176.25	4,913.85	618.33	17,239.04	33.00	920.04
Coyote	0	0	0	0	1.17	69.66	0	0
Fisher	0	0	0.25	29.59	0.67	79.29	0	0
Arctic Fox[c]	21.14	820.87	0.25	9.71	0.83	32.23	0.17	6.82
Coloured Fox[d]	61.87	5,726.80	6.75	576.24	9.50	829.04	0.33	25.91
Lynx	6.57	1,807.93	39.25	10,800.82	177.83	48,935.26	18.17	5,000.02
Marten	2,026.57	77,475.77	668.50	25,556.76	1,145.33	43,785.97	37.00	1,414.51
Mink	96.29	3,641.69	46.00	1,739.72	138.83	5,250.55	4.83	182.67
Muskrat	867.71	4,269.13	190.75	938.49	418.17	2,057.40	13.83	68.04
Otter	1.86	130.63	1.00	70.23	3.00	210.69	0.17	11.94
Squirrel	37.14	58.31	132.50	208.03	624.33	980.20	14.17	22.25
Weasel	55.86	75.41	15.75	21.26	91.67	123.75	5.83	7.87
Wolf	4.14	835.33	2.00	403.54	8.33	1,680.74	1.00	201.77
Wolverine	0.57	113.05	2.75	545.41	8.17	1,620.36	0.33	65.45
Years of data	7		4		6		6	

a= The average of available data between 1971-72 and 1978-79 (Fur Export Returns).
b= The values are based on the mean of 1978-79 and 1979-80 prices paid for furs in the Northwest Territories.
c= Blue and white fox have been combined although value has been calculated separately for each colour phase and summed for this table.
d= Red, cross, and silver fox have been combined although value has been calculated separately for each colour phase and summed for this table.

total value of furs harvested for each community (Table 2.5-2) were derived from the Trappers Incentive Program and are based on records of fur buyers (R. Tingling, pers. comm.).

Moose, caribou (barren-ground and woodland) and black bear are the most important big game species hunted by residents of communities within the corridor (Tables 2.5-3, 2.5-4 and 2.5-5). Near Fort Good Hope and Inuvik caribou are hunted more extensively than are moose, while near Fort Norman and Norman Wells the number of caribou and moose

TABLE 2.5-3
CARIBOU HARVEST BY COMMUNITIES WITHIN THE MACKENZIE VALLEY CORRIDOR (1964-1976).

Community	1964 -65[a]	1965 -66[a]	1966 -67[a]	1967 -68[a]	1968 -69[a]	1969 -70[a]	1970 -71[a]	1971 -72[a]	1972 -73[b]	1973 -74[b]	1974 -75[b]	1975 -76[b]	1977 -78[b]	Average
Inuvik	133	52	72	328	129	135	110	149	195	273	344	134	120	167.23
Fort Good Hope[e]	389	496	276	497	272	399	926	587	352	359	33	166	514	405.08
Norman Wells and Fort Norman	216	143	181	119	105	N/R	N/R	N/R	6	2	22	3	0	93.10
Fort Franklin[d]	199	246	134	67	103	N/R	N/R	N/R	9	25	49	49	2	
Wrigley	1	4	16	10	10	16	23	16	340	159	92	163	364	186.70
Fort Simpson and Jean-Marie River	39	35	54	28	45	38	44	26	21	14	11	24	21	14.38
Trout Lake[d]	N/R	N/R	N/R	N/R	N/R	8[c] 12[c]	N/R	N/R	19	N/R	56	104	67	46.25
									1	N/R	3	10	N/R	6.50

a = General hunting licence returns, cited in Bissett (1974)
b = General hunting licence returns, kill statistics
c = DIAND/MPS (1973).
d = Hunting areas occur within the corridor
e = Fort Good Hope and Colville Lake combined
N/R = no recorded harvest or unknown.

TABLE 2.5-4
MOOSE HARVEST BY COMMUNITIES WITHIN THE MACKENZIE VALLEY CORRIDOR (1963-1976).

Community	1963 -64[c]	1964 -65[a]	1965 -66[a]	1966 -67[a]	1967 -68[a]	1968 -69[a]	1969 -70[a]	1970 -71[a]	1971 -72[a]	1972 -73[b]	1973 -74[b]	1974 -75[b]	1975 -76[b]	1977 -78[b]	Average
Inuvik	27	21	15	21	35	13	22	40	19	12	24	10	15	5	19.93
Fort Good Hope[f]	136	141	116	76	114	66	43	78	78	99	89[f]	16	29	100	84.36
Norman Wells and Fort Norman	191	125	104	92	93	95	17	28	11	17	8	18	24	0	69.07
Fort Franklin[e]	37	55	88	50	22	23	N/R	14	N/R	22	20	51	50	1	
Wrigley	69	62	51	40	48	47	32	59	47	9	6	22	19	11	29.67
Fort Simpson and Jean-Marie River	135	140	64	177	160	150	67	139	120	31	12	16	32	23	40.64
Trout Lake[e]	N/R	N/R	N/R	N/R	N/R	N/R	12[d] 20[d]	N/R	N/R	55	4	52	64	103	102.14
										7	N/R	4	12	N/R	10.75

a = General hunting licence returns, cited in Bissett (1974)
b = General hunting licence returns, kill statistics
c = General hunting licence returns, cited in Dickinson and Herman (1979).
d = DIAND/MPS (1973)
e = Hunting areas occur
f = Fort Good Hope and Colville Lake combined
N/R = no recorded harvest or unknown.